AGRICULTURAL NEWS LETTER

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This publication contains information regarding new developments of interest to agriculture based on laboratory and field investigations of the du Pont Company and its subsidiary companies. It also contains published reports and direct contributions of investigators of agricultural experiment stations and other institutions as related to the Company's products and other subjects of agricultural interest.

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"RESEARCH MAKES JOBS"

Dr. Cole Coolidge, assistant chemical director of E. I. du Pont de Nemours & Co., in an address in New York October 16, said a recent study "indicates that the new projects and products that Du Pont will be ready to launch when the war is over, together with increased outlets for existing products, are expected to bring an all-time high in the company's peace-time employment."

"Certainly we are not alone in this prospect," he added in his address at the Herald Tribune Forum in the Waldorf Astoria.

Speaking on the theme "Research Makes Jobs," Dr. Coolidge continued:

"There can be no victory in this war if its end brings widespread unemployment and want in the United States. Even now we take counsel and consider the changes that must come with peace. As a people, we are as united in the objectives of this post-war effort as we are in our determination to crush Germany and Japan.

"Near the top on everyone's list is the hope for a high level of productive employment -- for an economy that will provide jobs for our returning veterans, for those now making war materials and for the youth that will come to maturity in the happier years which will follow the war.

"There is ample ground for entertaining such hopes. Research has provided millions of jobs in the past, and there is reason to believe it can do it again."

Dr. Coolidge expressed the belief that "the great research laboratories which have been established in America since the last war represent a national asset of extreme importance in the solution of future problems, particularly the problem of providing adequate employment at our high American standards."

Analyzing the importance of research in the pre-war period, Dr. Coolidge pointed out that in 1942 nearly half of Du Pont's gross sales -- 46 per cent, to be exact -- consisted of products that either did not exist in 1928, or were not then manufactured in large commercial quantities.

"Organized industrial research is the road to economic progress," he continued, pointing out that, in 1900, the "horse and buggy business" gave work to about a million persons as compared to the automobile industry's direct and indirect employment of more than 6,000,000 persons in a typical pre-war year.

"The performance of the chemical industry is comparable," Dr. Coolidge added.

Continued on next page

"How has progress of this kind been achieved? We say through research, but actually, the results spring from the teamwork of scientific development and capital investment, stimulated by the continuing demand of the American people for the economic progress that only this combination can produce.

"Our high standards of living, and our hope for the future, lie in our productivity. That is the key word of our whole industrial mechanism.

"The thousands of people making cellophane, nylon and neoprene, for example, hold jobs that at the end of the last war did not exist; and they are good jobs. Why are they good jobs? Why does an American workman earn more in one day than his Oriental counterpart earns in a month? The big reason is that he produces more.

"He produces more because of the research and the investment in tools and equipment that go into the making of his job, because of the technology that stands behind him, because of the skill that he has acquired. How much technology stands behind the Oriental carrying imported coal on his shoulders over a mountain range ribbed with some of the richest untouched coal veins in the world? He is not productive because he lacks the backing of a free science in a free land.

"American technology is what enables industry to maintain and constantly raise its standards, to pay high wages and still produce at continually lower cost, making its goods available to everyone."

Over 70,000 Research Workers in 3400 Industrial Laboratories

"In the chemical field," Dr. Coolidge said, "the American workman is backed up by a research force that has become a new power in the world during the last two and a half decades -- a research force that has destroyed forever the old myth of German technical supremacy.

"Here in the United States we have more than 70,000 research workers in 3400 industrial laboratories, many engaged in chemical research. From these laboratories have come thousands of new chemical compounds. The American chemical industry has outstripped that of any country in the world.

"In the post-war period, it remains for us to consolidate our gains, to continue our advance and to create a permanently fruitful economic structure. The means are at hand. Let me emphasize: It is science, it is investment in tools and equipment, and it is the American people together that can put these means to use."

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SPRAYING INSECTICIDES FROM AIRCRAFT MAY PREVENT SPRUCE BUDWORM D-DAY

Application of insecticide concentrates from aircraft, possibly the autogyro, to control spruce budworm infestations in Canada, may provide the most practical means of eliminating threatened invasion of this pest to the United States, eventually preventing extensive forest damage in both countries.

Spruce and fir forests in the United States subject to incipient infestations are located for the most part in the Lake States and New England.

Because of the threat in 1944, forest-insect control agencies arranged a cooperative experiment to test methods of applying sprays from aircraft to control spruce budworm in Ontario and Quebec. The Division of Entomology, Canadian Department of Agriculture, and the U. S. Bureau of Entomology and Plant Quarantine arranged to spray test plots on heavily infested timber lands in Canadian forests, using both aircraft and ground equipment.

U. S. and Canada Supply Bi-Plane and Autogyro for 1944 Tests

The United States supplied a bi-plane especially equipped with a spraying device for distributing highly concentrated sprays to be tried against the spruce budworm for the first time. Used for control of gypsy moth in Pennsylvania forests, where spraying with concentrates from aircraft has been highly successful, this new device makes it possible to spray in areas which ground machines cannot reach. Canada furnished an autogyro similarly equipped.

Aircraft Sprays As Many Trees In One Day As Ground Machine In Entire Season

Government experts point out that in addition to reaching inaccessible areas where infestation often first starts to build up, aircraft with this equipment can spray as many trees in a single day as one ground machine can cover in an entire season, and provide complete coverage of trees and ground plant foliage.

Previous Outbreaks Destroy Large Percentage of Trees and Much Pulpwood

A U. S. Department of Agriculture statement regarding the 1944 test points out that losses caused by outbreaks of spruce budworm are large.

"During the serious outbreak of 1910-20, which swept across Quebec, New Brunswick, Maine, and northern Minnesota, more than 225 million cords of pulpwood were destroyed," the release says. "From 1937, when the current outbreaks began in Canada, to 1943, approximately 90 per cent of the balsam fir and 50 per cent of the spruce had been killed in 12,000 to 15,000 square miles of infested forest areas in Quebec and Ontario. In an additional area of 30,000 square miles, an estimated 5 to 10 per cent of the timber has been killed, while considerable defoliation exists in other vast areas."

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SOIL CONSERVATION SERVICE FINDS DYNAMITE AIDS MILK PRODUCTION

"Dynamiting this year started hundreds of additional gallons of milk flowing to the big Fort Lewis Army base and other major West Coast war markets," says Carl P. Stevens, Montesano, Wash., District Engineer, Soil Conservation Service.

"By the turn of the 1944 spring growing season, not fewer than 15,000 feet of ditches had been blown neatly across previously useless, or, at least, low producing, lowlands.

"They had brought some 1,200 acres into productive condition in the Montesano-Elma-Oakville Soil Conservation District alone."

Drainage Means More and Better Pastures and Tillable Land

Floyd Sherwood, Head of the Sherwood Creek, Washington, Drainage Association, says:

"This gives us a chance to increase our milking herd. We have had quite a time in the past getting enough pasture, and cows produce heavier on better pasture.

"The drainage doubles the land that can be tilled when we finish clearing, and it hasn't cost us as much as we expected. The way it has been, it was too wet even to clear."

Water Holes Quickly and Economically Formed By Dynamite

In the Northern Great Plains Section, water holes are being quickly and economically formed by dynamite.

In the district, distances are great, weather is generally fair, rainfall light; draglines few and far between, and their use expensive.

"Along comes the blasting expert and moves dirt as cheaply, or cheaper, than with heavy equipment," reports Arthur W. Emerson, Lincoln, Neb., Chief of the Regional Division of Information of the Soil Conservation Service, summarizing the results of almost a dozen demonstrations of spring and water-hole blasting in the Dakotas.

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TWO DISTINCT METHODS OF BLASTING DITCHES

The product of years of experience in the field and in the laboratory, an authoritative booklet on "Ditching With Dynamite," particularly timely because of shortages of manpower and equipment, is being released by Du Pont.

The 32-page, two-color publication explains and illustrates the technique that is gaining wide application in agriculture, in pipeline and highway construction, and in mosquito and flood control. It includes instructions for using Du Pont Ditching Dynamite 50%, especially designed for such work, and will be sent on request to the Editor, Du Pont "Agricultural News Letter," Wilmington 98, Delaware.

Propagation Method Used In Wet Soils -- Electric Method In Wet or Dry

"There are two distinct methods of blasting ditches, the propagation and the electric," the booklet says.

"The propagation method can be used only in wet soils, while the electric method can be used in either wet or dry soils. In most instances, neither method is effective in loose, dry sand or gravel, in dry, hard-packed earth, or in soil or muck which is so fluid as to be unstable. However, even under these unfavorable conditions, an experienced blaster may occasionally get a fairly satisfactory ditch. The booklet explains the two methods as follows:

Propagation Method -- "In wet soils, the propagation method of using Du Pont Ditching Dynamite is generally the quickest and most economical. It can be employed in the roughest of swamps even where the surface is covered with heavy stumps and one to two feet of water.

"If the underlying soil is firm, it often works under even greater depths. In this method, only one hole is primed, the concussion from this explosion being sufficient to propagate the detonation through the wet earth and set off the next charge of dynamite and so on down the whole line of charges. The priming may be done with either an electric blasting cap or a blasting cap and fuse."

Electric Method -- "The electric method permits the blasting of ditches in ground that is too dry or too heavy for the successful use of the propagation method. In fact, it can be employed in almost any class of material except dry sand, in which it is practically impossible to blast ditches."

The electric method requires the insertion of a blasting cap in every charge, hooked up in series, and exploded simultaneously by means of a blasting machine.

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CHROMATED ZINC CHLORIDE PROLONGS LIFE OF GREEN PINE FENCE POSTS

Non-durable fence posts, such as those made of the lower grades of green pine, can be made relatively durable simply by letting them soak for a few days in a solution of chromated zinc chloride.

This chemical compound, applied by soaking the basal end of a post in a wooden trough or half a barrel containing a solution of "CZC" chromated zinc chloride, or steeping the entire post in a tank for a week or more, prolongs the life of the wood many years. This treatment protects it against termites or white ants, fungi, and the destructive organisms that normally attack untreated wood. Treatment of both basal and top ends of the post with "CZC" has also given satisfactory results.

"No one knows how long posts treated with chromated zinc chloride by the trough method will last, but a recent examination of sap pine posts, which have been in the ground nearly six years, showed 85 per cent of them in Calhoun County, South Carolina, to be still sound," according to W. C. Nettles, Entomologist, Agricultural Extension Service, Clemson College, S. C. "Untreated posts are usually destroyed in two years."

Full information on the "steeping treatment" may be obtained by writing the U. S. Forest Products Laboratory, Madison, Wisconsin, which has also published a report on the "Tire-Tube Method of Fence Post Treatment."

Trough Method Appeals to Farmers Because of Simplicity and Low Cost

In South Carolina Extension Circular 262, "Longer Life for Fence Posts," just issued, Mr. Nettles stresses particularly the use of hot and cold bath with creosote and the application of chromated zinc chloride by the trough method. He adds that the low cost and the simplicity of the latter method appeal to farmers, many of whom have had satisfactory results from its use.

It involves merely soaking the basal end of the posts for a specified number of days in half of a wooden barrel or in a wooden trough containing recommended amounts of chromated zinc chloride solution.

"At the end of the treating period, the posts should be removed and allowed to air-dry with the basal end turned up for at least a month before setting in the ground at a depth of 30 inches," the Circular recommends.

Lends Itself Admirably to Community Participation

Mr. Nettles, who has had the opportunity of assisting in the development of this simple method, says it lends itself admirably to community participation.

Continued on next page

He has taken part in the actual treatment of posts in South Carolina practically every month during the past six years.

"Use of a trough or barrel, eliminating the necessity of using old inner-tubes, which became scarce because of war conditions, was suggested by E. C. Turner, Soil Conservation Specialist of the Clemson Extension Service," he adds. The South Carolina Agricultural Experiment Station has somewhat modified the original procedures which involved soaking both ends of the posts, and has prepared detailed instructions which show that proper soaking of the basal end only gives good results. South Carolina Circular No. 262 will be sent on request to the Editor, Du Pont "Agricultural News Letter," Wilmington 98, Delaware.

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LEAFLET SAYS NODULAR WORM CONTROL IS BOTH PATRIOTIC AND PROFITABLE

Control of nodular worms in sheep helps save the lives of wounded American soldiers on all battle fronts.

Normally nodular worms cause an annual loss of $6,000,000 by damaging sheep intestines which would be sufficient to make 15,000,000 absorbable surgical sutures. This is in addition to other losses resulting from unthrifty sheep, reduced fleece and meat yields, and even occasional death of the animals.

So says a leaflet recently issued by the National Livestock Conservation Program, copy of which will be sent upon request to Fred H. Leinbach, Director, 59 E. Van Buren St., Chicago 5, Illinois.

The cover page says: "You wouldn't tie the surgeon's hand," and shows a drawing of a wounded soldier pleading for surgical aid to two rubber-gloved hands which are unable to respond because they are bound together symbolically through lack of sutures used in operating.

The leaflet advocates use of phenothiazine, which "besides giving positive control of nodular worms, also helps control stomach worms." It gives instructions for its use in northern states and in southern states, and cautions that "one sheep missed or improperly treated may reinfect the whole flock."

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TEN STEPS IN CONTROL OF OVINE LUNGWORMS

The following plan for control of ovine lungworms is recommended by D. F. and M. W. Eveleth, whose research work is reported below:

1. Place sheep showing advanced symptoms of lungworm disease in a dry sheltered pen and provide an adequate ration.
2. Treat these sheep by intra-tracheal injection of 5-10 cc. of an aqueous suspension of phenothiazine.
3. Feed all sheep a 1:9 mixture of phenothiazine and salt.
4. Periodically select individuals showing symptoms from main flock for individual intra-tracheal injection.
5. Return injected animals to flock as they show improvement.
6. Do not give injections at less than two-week intervals.
7. Keep sheep and lambs away from low damp pastures.
8. At all times, where any form of parasitism is a problem, feed supplementary grain to sheep showing evidence of disease.
9. Do not treat sheep showing evidence of advanced pneumonia by intra-tracheal injections of any kind.
10. Fence off ponds and swamps and use either a trough or running water as a source of drinking water for all sheep.

PROGRAM FOR CONTROL OF LUNGWORMS IN SHEEP INCLUDES INTRA-TRACHEAL INJECTION OF AQUEOUS PHENOTHIAZINE SUSPENSION PLUS FEEDING PHENOTHIAZINE

Intra-tracheal injection of an aqueous suspension of phenothiazine, plus oral dosages of the drug used for control of intestinal parasites such as nodular and stomach worms, is suggested by D. F. and M. W. Eveleth, veterinarians, as an effective aid in control of lungworms and lungworm disease in sheep. Since injections are made by puncturing the trachea in a downward direction, and in the lower third near the thoracic inlet, only a qualified veterinarian should attempt this treatment.

Continued on next page

Under ordinary farm conditions, prevention of continued infestation of the lungs and bronchi is often difficult, and the incidence of complicating bronchitis and pneumonia frequently causes heavy losses from emaciation and even death, not only of sheep but of other livestock such as goats, cattle, and hogs.

Detailed Report of Experiments Published

A detailed report of the research conducted on sheep by the Eveleths, released as Research Paper No. 778, Journal Series, University of Arkansas, appears in Michigan State College "Veterinarian", Vol. 4, No. 1. This report, in turn, is reviewed by the Jensen-Salsbery Laboratories of Kansas City, Mo., in "Jen-Sal Journal", Vol. 27, No. 3, with the additional announcement that by special methods it has been found possible to obtain a sterile aqueous suspension, named Pul-Verm, containing a concentration of 0.25 gm. of phenothiazine per cubic centimeter in an aqueous base through use of a special wetting agent.

D. F. and M. W. Eveleth in a previously published paper reported comparatively efficient results following intra-tracheal injection of phenothiazine suspended in alcohol and glycerol. However, in a later experiment an aqueous suspension of phenothiazine was used in sheep with a moderate infection of lungworms. At post-mortem examination no lungworms were found. The lungs were not as severely damaged as in the previous test with the alcohol-glycerine suspension, although a dose of 10 cc. was injected.

The experimenters observed that after every intra-tracheal injection, or after dosing with phenothiazine to control stomach and nodular worms, the lungworm larvae eliminated by the animals were dead. This finding suggested the possible use of the continuous feeding of phenothiazine in order to kill the freed lungworm larvae in the digestive tract.

Test on Goats Reveals Good Tolerance to Aqueous Suspension

The "Jen-Sal Journal" article states that tests on brush goats used in the production of rabies vaccine revealed a surprisingly good tolerance to the aqueous suspension when given intra-tracheally.

"In one instance, a mass dose of approximately 20 cc. was given to a 50-pound goat without evidence of respiratory distress or subsequent complications. Ten cc. doses were well tolerated by all other goats treated intra-tracheally.

The suggested dosages are: lambs 40 pounds and over, 10 cc.; adult sheep and goats, 10 to 15 cc.; calves, 15 to 20 cc.; adult cattle, 20 to 30 cc.; swine, according to body weight, 5 to 15 cc. The treatment may be repeated within three weeks.

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PHENOTHIAZINE USED AS ANTHELMINTIC GREATLY REDUCES DEATH RATE OF SHEEP

Mortality in sheep treated with phenothiazine for control of certain internal parasites showed a drop of almost 50 per cent with a comparable increase in profits for the flock owners, according to a study reported by two Ohio scientists.

Under the title "Some Practical Results of Using Phenothiazine in the Treatment of Yearling Wethers," by Dr. James E. Guthrie and Dr. Paul D. Harwood of Ashland, Ohio, a report of the work was published in the "Journal of the Tennessee Academy of Science," Vol. 18, No. 4.

Phenothiazine was applied in a treatment of 25 grams each to 2,372 Texas yearling wethers on Indiana summer pasture. A second group of 1,589 head received no medicament.

After 120 days on the feedlots of the Evansville, Ind., Producers' Commission Association, a total of 74 or 4.7 per cent of the untreated sheep had died, compared with only 2.5 per cent or 60 of the animals treated with phenothiazine.

Treated animals showed an average daily profit of 3.32 cents per head, compared with 1.88 cents per head for the untreated sheep. The total increased profit resulting from the therapy averaged $1.70 per head for the period. The difference in weight gained for the treated animals over the untreated averaged 10.3 pounds.

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HENS REQUIRE "ELBOW ROOM" AT THE MASH HOPPER

Hens that are fed mash spend several hours daily at their meals. If the hopper space is restricted the hens fight, and only the boss hens get what they want. Laying hens need six inches of feeding space, says Dr. O. B. Kent in the current issue of Du Pont's "Poultry Comment." The article says it is much more practical to put in adequate hopper space when the birds are housed than to cull them to conform with the hopper space provided, as is done by many poultrymen who have a 10-foot hopper for 100 birds. It recommends four hoppers 6¼ feet long and open on both sides for 100 birds. It suggests building the hopper on the floor, like the usual V-shaped hog trough, with boards on the side to keep the feed from being kicked out, and with no wires or anything to interfere with eating.

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MAINE BULLETIN DISCUSSES AMMONIUM SULFAMATE FOR KILLING POISON IVY

Poison ivy and other noxious weeds that cause distressing eruptions of the skin of many persons who touch them need no longer be tolerated as a community menace.

Two University of Maine scientists, G. P. Steinbauer and F. H. Steinmetz, botanists, in Bulletin No. 321, "Poison Ivy and Poison Sumac -- Identification and Eradication," recently issued by the Maine College of Agriculture Extension Service, state that several methods of control of poison ivy have been developed "so that it is no longer necessary to allow this pest to survive if an individual or a community is determined to get rid of it."

After discussing briefly such methods as digging, pasturing, and burning -- all of which have serious handicaps -- the bulletin deals with the good and bad features of several chemicals that can be used to exterminate weeds. Some, they say, create fire hazards, some may ruin the soil for other plant life, while one requires the wearing of rubber footwear because it tends to shrivel leather.

Safe, Easy to Apply, Effective

The bulletin asserts that ammonium sulfamate, the active ingredient in Du Pont's "Ammate" weed killer, is one of the safest, easiest, and most effective chemicals to handle and apply. According to the Maine authorities, ammonium sulfamate is not particularly poisonous to animals, does not constitute a fire hazard, does not sterilize the soil for any great length of time, and does not injure the heavy bark of trees and shrubs, although it should be kept away from the young twigs and leaves of valuable plants.

For these reasons, the bulletin says, ammonium sulfamate is "particularly useful in destroying poison ivy in woodlots and waste places." The publication cautions that, regardless of method used to kill the plants, treated areas should be watched for one or two seasons after the poison ivy seems to have been destroyed.

"Poison ivy seeds may remain uninjured in the soil and develop into seedlings years later," it says.

The bulletin concludes that the chemicals used to kill ivy should be useful in killing poison sumac, as trials have shown that a variety of broadleafed woody plants are killed by ammonium sulfamate. Information from other research workers shows that it also kills poison oak, which is a serious menace in many areas.

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EFFICACY OF VITAMIN D FROM DIFFERENT SOURCES FOR TURKEYS

The efficacy of different sources of vitamin D for chickens and turkeys has long engaged the interest of scientific investigators. Results of recent experiments conducted by Dr. Robert V. Boucher, Department of Agricultural and Biological Chemistry, Pennsylvania State College, now provide an authoritative basis for an evaluation of vitamin D effectiveness for turkey poults.

A summary of Dr. Boucher's report, published in "The Journal of Nutrition," Vol. 27, No. 5, follows:

"1. Different levels of vitamin D from four different sources, namely U.S.P. reference cod liver oil No. 2, a sardine oil fortified with fish liver oils, an irradiated animal sterol, and irradiated 7-dehydrochloestrol were fed to poults as supplements to a rickets-producing diet during the first 4 weeks of life. All supplements were fed on the basis of their A.O.A.C. chick unit potency.

"2. There were distinct differences in efficacy among the supplements, suggesting that the poult utilizes certain forms of vitamin D with degrees of efficacy that differ from the chick and in this response exhibits a higher degree of species specificity than the chick.

"3. The vitamin D of the two irradiated products was distinctly more efficacious, on the basis of chick units fed, in increasing the ash content of the bones than the vitamin D of reference cod liver oil. Comparing the results obtained over the entire range of bone ash responses, this difference in efficacy is of the order of 2 to 1. While the fortified sardine oil was measurably more efficacious than the reference cod liver oil, it gave a response curve more nearly like that of cod liver oil than like the irradiated products.

"4. It is concluded that the vitamin D potency expressed in A.O.A.C. chick units is not necessarily a true measure of the value of a vitamin D supplement for turkeys."

NOTE: An abstract of Dr. Boucher's report, summarized above, is given on the following pages.

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RESEARCH AT PENNSYLVANIA EXPERIMENT STATION SHOWS EFFICACY OF D-ACTIVATED ANIMAL STEROL (VITAMIN D) FOR TURKEY POULTS

Turkeys have a higher requirement for certain specific nutrients than do chickens. This is particularly true of vitamin D, says Dr. Robert V. Boucher, Pennsylvania Agricultural Experiment Station, reporting results of his experiments, summarized on the preceding page.

Dr. Boucher points out that the primary object of his experiments was to compare the efficacy of vitamin D from different sources for turkeys, particularly when fed on the basis of equal potency, measured by A.O.A.C. chick units. He felt also that his studies would help resolve the lack of agreement among scientists who had earlier investigated the requirement of young turkeys for this essential nutrient.

Percentage Composition and Analysis of Basal Diet

The percentage composition and analysis of the basal diet used by Dr. Boucher follow:

Ground yellow corn	25.9	Ground oats	10.0	Dried brewers' yeast	6.0
Soybean oil meal	12.0	Dried skim milk	8.0	Ground limestone	2.0
Wheat bran	10.0	Dehydrated alfalfa meal	7.5	Corn oil (Mazola)	2.0
Wheat middlings	10.0	Commercial casein	6.0	Sodium chloride	0.5
				Manganese sulfate	0.1

Protein (N x 6.25) %	24.56	Crude fiber %	5.18
Moisture %	9.74	Calcium %	1.05
Ash %	5.46	Phosphorus %	0.63
Ether extract %	5.43	Manganese %	0.01

Riboflavin--micrograms per 100 gm	575
Vitamin A--International units per 100 gm.	1724

Preliminary Trial Encourages Further Experiments

In a preliminary trial with three groups of poults, Dr. Boucher determined that the basal diet was satisfactory for producing rickets and that there might well exist distinct differences between different vitamins D in their ability to prevent rachitic manifestations in poults.

Four Vitamin D Supplements Compared

A more extensive and quantitative comparison of four vitamin D supplements from different origins was then undertaken. In two separate experiments these

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supplements were fed at various levels, the second experiment being planned and carried out after the results of the first had been carefully studied. The vitamin D supplements used were:

1. U.S.P. reference cod liver oil No. 2
2. A corn oil solution of an irradiated animal sterol
3. A corn oil solution of irradiated 7-dehydrocholesterol
4. A fortified sardine oil.

These materials, according to Dr. Boucher, were chosen because they were representative of vitamin D of diverse origin, and also of those largely used in modern poultry feeds. He says:

"The reference cod liver oil was a standard test substance of known vitamin D content and in addition was presumed to be representative of cod liver oils in general. The fortified sardine oil was supplied with the assurance that all of its vitamin D activity came from fish oil sources. It was assumed that its vitamin D activity would be representative of sardine oil plus whatever high potency liver oil was used for increasing its D content. The irradiated animal sterol was prepared by irradiating with ultraviolet light the purified sterol mixture isolated from a species of mussel. The exact chemical nature of the vitamin D which it contained has not been reported. The irradiated 7-dehydrocholestrol, on the other hand, contained a single known vitamin D, namely D_3. Both irradiated products have come into wide commercial use under the designation of D-Activated Animal Sterol. The various levels of the supplements were introduced into the diet by pre-mixing with the corn oil component."

Twelve to Fourteen Turkey Poults Used in Each Group

Twelve to fourteen White Holland and Bronze turkey poults in each group were started when one day old, and kept for 28 days in electrically heated brooders equipped with hardware cloth floors and automatic waterers. The brooders were in a laboratory from which all direct sunlight was excluded. The experimental diets and tap water were kept before the poults at all times for voluntary consumption. At the end of each experiment the surviving poults were killed and the tibias removed for ash determination, and the average value for each group of bones recorded.

Results and Conclusion

Dr. Boucher summarizes his results as follows:

First Experiment: "In the first experiment, 19 groups of poults were used. These were divided as follows: poults in one group received the basal diet alone; six groups of poults received the basal plus levels of reference cod liver oil ranging from 20 to 200 units per 100 gm. of diet; and four groups of poults were placed on each of the other three supplements. The levels at which these supplements were fed were chosen in the hope that they would yield responses which could be compared quantitatively with those given by the reference

Continued on next page

oil. The range originally planned was from 20 to 120 A.O.A.C. units of each supplement per 100 gm. of diet but the final assigned A.O.A.C. potency, calculated after the turkey experiments had been started, modified these values slightly. Detailed information on the results obtained from experiment 1, such as mortality, body weight, dry weight of bone, and bone ash percentage is summarized in Table 1."

TABLE 1 - Summary of experiment 1.

GROUP	SUPPLEMENT PER 100 GM. BASAL DIET			MORTALITY DUE TO RICKETS	RESULTS AT 4 WEEKS OF AGE			
	Source	mg.	A.O.A.C. units	%	No. of poults	Body weight gm.	Tibia weight gm.	Tibia ash %
1	None	0	0	92	1	112	.4221	25.5
2	Reference	174	20	92	1	192	.5780	32.4
3	cod liver	348	40	67	4	209	.6776	32.8
4	oil	696	80	0	12	260	.8352	35.0
5		1043	120	0	12	307	.9915	42.7
6		1391	160	0	12	285	.9199	42.2
7		1739	200	0	13	302	.9780	44.6
8	Irradiated	47	19	42	7	176	.5885	31.5
9	animal	93	39	9	10	247	.7770	37.4
10	sterol	186	77	0	13	265	.8069	47.7
11		279	116	0	12	276	.8703	48.7
12	Irradiated	47	17	64	4	186	.5845	31.0
13	7-dehydro-	93	35	8	11	217	.7302	34.8
14	cholesterol	186	70	0	13	335	1.0677	45.8
15		279	105	0	13	299	.9304	46.1
16	Fortified	44	19	69	4	187	.5648	27.4
17	sardine	89	38	42	7	210	.6933	31.3
18	oil	178	76	22	7	242	.7442	38.3
19		267	115	0	12	294	.9261	41.2

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Second Experiment: "In order to confirm the surprising differences in efficacy noted among the supplements in the first experiment, a second was carried out. In this second experiment 20 groups of poults were used, these being distributed as in the first except that 7 groups of poults received reference cod liver oil. The levels fed of each supplement were adjusted somewhat from those used in the first experiment in order to facilitate quantitative comparisons. In addition, higher levels of reference cod liver oil were fed because of the evidence that 200 units did not produce maximum bone ash in the first experiment. Details and results of experiment 2 are presented in Table 2."

Conclusion: "From a study of the results of these experiments it was quite clear that the vitamins D in the two irradiated products were much more effective in promoting calcification in turkey poults than those of the fish oils when compared on the basis of A.O.A.C. chick units fed. The results of the two experiments agreed very well."

TABLE 2 - Summary of experiment 2.

GROUP	SUPPLEMENT PER 100 GM. BASAL DIET			MORTALITY DUE TO RICKETS %	RESULTS AT 4 WEEKS OF AGE			
	Source	mg.	A.O.A.C. units		No. of poults	Body weight gm.	Tibia weight gm.	Tibia ash %
1	None	0	0	88	1	137	.7106	28.3
2	Reference	348	40	10	9	226	.6112	33.5
3	cod liver	522	60	0	8	261	.7121	38.7
4	oil	696	80	0	8	295	.8676	40.5
5		870	100	0	10	284	.8411	42.6
6		1217	140	0	9	279	.8208	46.4
7		1739	200	0	10	302	.9825	47.1
8		2609	300	0	8	302	.9278	47.3
9	Irradiated	93	39	0	9	231	.6465	40.8
10	animal	140	58	0	8	264	.7394	46.2
11	sterol	186	77	0	9	237	.6829	49.1
12		233	97	0	5	287	.8478	49.1
13	Irradiated	93	35	0	7	203	.5869	39.1
14	7-dehydro-	140	52	0	8	234	.6563	42.5
15	cholesterol	186	70	0	7	282	.8747	47.6
16		233	87	0	7	252	.7505	49.1
17	Fortified	133	57	0	8	230	.6210	41.2
18	sardine	222	96	0	9	228	.6564	44.7
19	oil	311	134	0	8	283	.8650	47.5
20		444	191	0	9	326	.9388	49.8

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COOPERATIVE INVESTIGATIONS OF SEED-TREATMENT OF FLAX

Good stands are essential in the successful production of flax. Thin or irregular stands cannot compete with weeds or produce maximum yields.

So states Dr. H. H. Flor, pathologist, U. S. Bureau of Plant Industry, Soils and Agricultural Engineering, in reporting results of seed-treatment investigations conducted in cooperation with the North Dakota Agricultural Experiment Station, Fargo, N. D.

Dr. Flor says that the development of powdered disinfectants some years ago renewed interest in seed-treatment of flax for the control of seed-borne diseases.

In the spring of 1942, he obtained the use of 74 lots of flaxseed through the courtesy of Miss Edith Higgins, supervisor, N. D. State Seed Laboratory. These were random selections from lots that had been sent in by producers for purity and germination tests. Non-treated seed and seed treated with New Improved "Ceresan" seed disinfectant (5% ethyl mercury phosphate) at approximately 1/2 ounce per bushel, were sown in adjacent rows in triplicate in the field May 20, 1942, and emergence counts were made 12 and 24 days after sowing. Dr. Flor summarizes his findings as follows:

Treatment with New Improved "Ceresan" seed disinfectant at the rate of one-half ounce per bushel was beneficial to all lots of yellow-seeded or Golden flax.

Treatment with New Improved "Ceresan" also increased the stand of high quality, brown-seeded flax that contained broken and cracked seed. Most lots of brown-seeded flax having 80 to 89 per cent germination were benefited by treatment, as were some lots having appreciable quantities of weathered or discolored but not sprouted seed.

Treatment with New Improved "Ceresan" was not beneficial to seed lots of high quality that showed little mechanical injury.

Seed lots having low germination and containing sprouted seed were not benefited by seed-treatment.

Dr. Flor says his observations suggest that New Improved "Ceresan" protects the cracked seed and the weaker seedlings from rotting by soil-inhabiting micro-organisms during germination and emergence. Apparently, undamaged seed of high viability does not require this protection. Seeds not viable in laboratory germination tests, such as those that sprouted before harvest, are not revived by treatment with New Improved "Ceresan."

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GEOGRAPHIC DISTRIBUTION OF BACTERIAL WILT OF TOBACCO

"Bacterial, or Granville, wilt (Bacterium solanacearum E. F. Smith), when first described by Stevens and Sackett in 1903, was found only in restricted areas of southern Granville County, N. C. At the present time the disease is uniformly distributed and highly destructive in southern Granville County and in adjoining areas of Wake and Durham Counties. It has been reported also from every county in the State growing flue-cured tobacco, but the most rapid spread during recent years was in several areas of the Coastal Plain. Bacterial wilt has been reported also from Maryland, Virginia, South Carolina, Georgia, Florida, and from most of the important tobacco-growing regions of other countries."--U. S. D. A. Circular No. 692.

"URAMON" IN CORN-TOBACCO ROTATION CONTROLS BACTERIAL WILT OF TOBACCO

Newly published information based on recent research reveals that "Uramon" fertilizer compound not only supplies nitrogen plant food, but in a corn-tobacco rotation serves as an effective control of bacterial wilt in heavily infested tobacco fields, especially on sandy soils low in organic matter.

U. S. Department of Agriculture Circular No. 692, recently issued, reports that in continuation of experiments conducted by Smith and Poole in North Carolina, 1,000 pounds of "Uramon" per acre, supplying 420 pounds of nitrogen in the form of urea, broadcast on the soil surface and mixed into the cultivated layer with spade, moldboard plow, or disk, gave effective control of wilt; and tobacco grown on treated soil in rotation with one year of corn produced a normal crop of high quality leaf.

In fact, 420 pounds of nitrogen per acre applied as "Uramon," ammonium carbonate, or ammonium sulfate gave wilt control but, according to Circular 692, the "Uramon" appeared of "more promise for commercial use, and soil treatment with this compound controlled wilt on seven other host plants, including tomato, Irish potato, and eggplant."

Also Gives Large Increase in Yield of Corn in Rotation

Use of "Uramon" appears economically sound in view of the reduction of loss from tobacco wilt and the increased corn yields, the circular says. On soils where 90 to 100 per cent of the tobacco was killed by wilt the previous year, "Uramon" reduced wilt infestation to an average of only 13 per cent. An application of 1,000 pounds of "Uramon" per acre, plus 500 pounds of a phosphate-potash fertilizer (0-10-10) applied later, gave an average yield of 55.8 bushels

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of corn; while only 250 pounds of "Uramon" plus 500 pounds of 0-10-10 did not give adequate wilt control and produced only 27.1 bushels of corn per acre.

Bacterial Wilt Is "One of Most Destructive Diseases of Tobacco"

The circular, entitled "Control of Bacterial Wilt (Bacterium solanacearum) of Tobacco As Influenced by Crop Rotation and Chemical Treatment of the Soil," by Dr. T. E. Smith, Division of Tobacco Investigations, U. S. D. A., and Associate Pathologist, Branch Tobacco Station, Oxford, N. C., emphasizes the destructiveness of this disease. It says:

"Bacterial wilt, one of the most destructive diseases of tobacco, not only reduces the production of a crop in great demand by the armed services as well as civilians, but also results in a waste of time and labor when both are urgently needed by the farmers who grow tobacco along with other crops."

Summary of Results of "Uramon" Treatment Combined with Rotation

Discussing the results of the experiments, the circular says that application was more effective in spring than in fall, especially with rates of "Uramon" supplying 210 and 105 pounds of nitrogen an acre. It continues:

"Transplants set 6 weeks after treatment in spring were stunted during the early part of the growing season, but following treatment in fall, plant injury of consequence was not experienced. Tobacco grown in the summer after treatment was worthless commercially because of the excessive nitrogen applied. The leaf did not ripen even though treatment was made the previous fall to promote leaching and the crop fertilized with an 0-10-10 mixture at the rate of 1,000 pounds an acre in an attempt to rebalance the nutrient supply."

The leaflet explains that tobacco of good quality was produced on soil fertilized with "Uramon" by growing it in rotation with one year of corn in small plot trials completed in 1941. This experiment was repeated in 1943 at five locations, in which the tobacco ripened and cured well. At one location where data were taken on plots in triplicate, the 1,000-pound rate of "Uramon" averaged 977 pounds of tobacco an acre that sold for $39.30 a hundredweight, "a normal yield and value for the sandy loam soil on which the test was conducted."

The circular reports that the quantity of "Uramon" required for wilt control, when used in combination with the corn rotation, was investigated on a total of nine replicates at the five locations previously mentioned. These sites were selected during the summer of 1941 in fields where 90 to 100 per cent of the tobacco was killed by wilt. Rates of 250, 500, and 1,000 pounds of "Uramon" per acre were applied in October 1941 or March 1942, corn was grown in 1942, and tobacco in 1943.

"Corn made vigorous growth in all places," the circular says.

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At one site where 500 pounds of 0-10-10 fertilizer per acre was applied under the crop on plots in triplicate treatments of 250, 500, and 1,000 pounds of "Uramon," corn averaged 27.1, 46.8, and 55.8 bushels an acre, respectively.

The extent of wilt on tobacco grown in 1943 is summarized below:

Percentage of Wilt on Tobacco Grown in Rotation with One Year Of Corn on Soil Treated with "Uramon" Fertilizer Compound (42 Per Cent Nitrogen)

Acre Rate of Application	Block No. 1	2	3	4	5	6	7	8	9	Mean
Lbs.	%	%	%	%	%	%	%	%	%	
250	*42	59	73	65	81	45	59	53	90	**63.0
500	20	31	48	35	27	19	46	45	57	36.4
1,000	10	10	17	17	7	11	20	17	8	13.0

*Counts made Aug. 1 on plots of 70 to 110 plants each.
**Least significant difference at 1 per cent level: 18.47.

"As shown, the 250- and 500-pound rates gave wide variations in wilt, and on most plots reductions in wilt severity were not adequate. The 1,000-pound rate gave greater and more uniform reductions in disease severity, in that 20 per cent was the maximum of wilt on any plot where this treatment was used," the circular continues. "An average of 13 per cent wilt occurred on all nine replicates, a reduction considered satisfactory for commercial use."

The publication adds that soil treatment with "Uramon" "appears economically sound in view of the increased corn yields obtained and the prevention of loss from wilt. This loss often exceeds $100 an acre."

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DU PONT MARKETS DIMETHYLOLUREA FOR TREATING WOOD UNDER TRADE-MARK "ARBONEELD"

The Du Pont Company has announced that it will market the chemical, dimethylolurea, used in treating wood by a new process which virtually transmutes lumber into a new material, under the trade-mark "Arboneeld."

In making this announcement at the annual meeting of the Chicago Furniture Manufacturers Association in September, L. F. Livingston, Manager of Du Pont's Extension Division, said that wood is transmuted by impregnating it with "Arboneeld" dimethylolurea and urea to impart to it entirely new properties and characteristics.

The process, announced earlier in the year, makes soft woods hard, hard woods harder, reduces their tendency to swell, shrink, or warp, and improves their durability and compressive strength. It is the result of general long-range investigations conducted over many years by the Forest Products Laboratory of the United States Forest Service, Du Pont, and other groups.

Solution Forms Resin Within Structure of Wood

A solution of urea and "Arboneeld" dimethylolurea forms a resin within the wood structure, making it harder, denser, and more durable.

Mr. Livingston pointed out that "Arboneeld" could bring many improvements to the daily life, principally:

1. Wood products of greater beauty in their natural colors.
2. Wood products that will last longer and scar less.
3. Wood with pleasing colors, not only on the surface but all through the product.
4. Drawers and doors that have less tendency to stick in damp weather.
5. Entirely new wood products.
6. Wood more resistant to surface damage and easier to repair.
7. Greater prosperity for many wood-growing sections.

Mr. Livingston said the process would enable manufacturers to use plentiful, low-cost woods instead of scarce, costlier varieties. He said wood treated with "Arboneeld" could be worked more accurately, is more resistant to flame, rot, pests, and chemicals; and that the new process would bring construction economies through the use of wood of greater strength.

Applications for Wood Treated with "Arboneeld" Include Farm Implement Parts

Possible applications for wood treated with "Arboneeld" and urea include furniture, flooring, boats, machinery parts, veneers, sporting goods, musical

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instruments, sanitary ware, laundry equipment, office and store equipment, cabinet work, Venetian blinds, tool and knife handles, millwork, screen and door sash, rollers, wood heels, shoe lasts, pencils, vats and tanks, chemical equipment, and agricultural implement parts.

The process has not been developed fully in the commercial sense, but has reached a point where some processors are nearly ready to begin regular treatment of wood products.

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UREA IMPROVES RUMEN SYNTHESIS OF THE VITAMIN B COMPLEX

On a ration of timothy hay only and in the absence of protein other than in the timothy hay, "the addition of urea as a source of nitrogen definitely increased the synthesis of riboflavin, nicotinic acid, biotin, and pantothenic acid in the bovine rumen when a readily available carbohydrate was present," in experiments conducted at the University of Wisconsin by C. C. Lardonis, R. C. Mills, C. A. Elvehjem, and E. B. Hart. Results of these experiments were reported in the "Journal of Dairy Science," Vol. 27, No. 7. A cow and a calf with rumen fistulas were fed each of the following rations for a period of one month:

1. Timothy hay (12 lbs.)
2. Timothy hay (10 lbs.) Corn molasses (4 lbs.)
3. Same as No. 2 plus 200 grams of urea per day.
4. Timothy hay (10 lbs.)
5. Timothy hay (10 lbs.) Corn molasses (2 lbs.) Starch (2 lbs.)
6. Same as No. 5 plus 200 grams of urea per day.
7. Timothy hay (10 lbs.) Corn molasses (2 lbs.) Starch (2 lbs.) Casein (acid washed) (0.2 lbs.)
8. Same as No. 7 plus 200 grams of urea per day.

At the end of each period a sample of the rumen contents was removed for vitamin assay.

Increased synthesis of nicotinic acid, biotin, riboflavin and pantothenic acid in the rumen of both animals was shown where nitrogen as urea was added to a ration in which molasses or a readily fermentable carbohydrate was included. The synthesis of pyridoxine could not always be correlated with a variation in the ration, but in some instances the addition of urea to the ration containing a fermentable carbohydrate increased the synthesis of pyridoxine. Addition of urea showed no definite effect on the content of "folic acid" or thiamine.

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